## Learning to live with El Niño

Graeme O'Neill

"...the rise and fall of seasons suits the rise and fall of rhyme But we know the western seasons do not run on schedule time For the droughts will go on drying while there's anything to dry Then it rains until you'd fancy it would bleach the sunny sky Then it pelters out of reason, till the downpour day and night Nearly sweeps the population to the Great Australian Bight. It is up in northern Queensland that the seasons do their best; But it's doubtful if you ever saw a season in the West – There are years without an autumn or a winter or a spring There are broiling Junes, and summers when it rains like anything."

## - 'The City Bushman', by Henry Lawson



USTRALIA'S capricious climate is a recurrent theme in our poetry and prose. But writers are not alone in their fascination with climate's mysteries. Even as Henry Lawson penned 'The City Bushman', a curious link between droughts in Australia and India was being pondered by South

Australia's Government astronomer, Sir Charles Todd.

A century on, climatologists can explain Todd's discovery. Drought and flood in eastern Australia are related to a climatic pattern known as 'El Niño'.

Originally, El Niño was seen as an oceanic event of importance only to the west coast of South America. But scientists now know the oceanic El Niño is linked to an atmospheric partner: the Southern Oscillation. The term ENSO (El Niño-Southern Oscillation) relates to both components, whose combined influence on climate is known to extend globally.

The name El Niño was adopted quickly in Australia as it identified the reason for the severe droughts and bushfires that affect the eastern two-thirds of the continent. Australians welcomed the prospect that the climatic swings of the past two centuries might be founded on an underlying, even predictable, pattern.

Today that prospect is close to being realised. An intensive international research effort to understand El Niño-Southern Oscillation episodes has generated computer-based models of global climate (GCMs). Though still rather rudimentary, some of these models, including CSIRO's own CSIRO9, are yielding climatic patterns that broadly resemble El Niño.

Given the promise of these models, CSIRO is preparing to capitalise on their predictive power. It has initiated a program that aims to contribute to Bureau of Meteorology climate forecasts for use by Australian industries, water-management authorities, and urban and economic planners. The program will combine the skills of 14 CSIRO divisions, the Bureau of Meteorology and other federal and state research agencies.

Coordinator of the Climate Variability Program, Dr Chris Mitchell, says it will give new coherence to climate research, having impacts on Australian industry and the economy, as well as on the Australian psyche.

Mitchell, who is based at CSIRO's Division of Atmospheric Research at Aspendale in Victoria, says although we can never control climate, we can plan for climatic extremes, and manage their impacts.

'We know that climate strongly influences the natural environment, that it has a severe impact on our agriculture, fishenes and forests, and also affects the built environment: our cities, coastal installations and water storages,' Mitchell says. 'We now need to understand how climatic extremes affect the country as a whole, so that we can manage these impacts.

The program is ultimately about risk management. If we know a year ahead that spring will be drier than usual in Queensland, we can prepare for drought. If it's going to be wetter, we can take take advantage of that.

'We also need to develop ways of making those forecasts useful to the people who need them, and that's as complicated as the forecasting itself. We will be working to develop decision-support systems for client industries and agencies.

'By the year 2000 we hope to see the Bureau of Meteorology issuing regional forecasts of climatic extremes. There may be a niche for private enterprise in translating these forecasts and developing computerbased decision-support systems for industry.'

Chief of the Division of Atmospheric Research, Dr Graeme Pearman, says reliable forecasting of climatic extremes could save Australia tens of millions of dollars.

Pearman says the program's secondary purpose is to build on specialised climate variability research that has extended for more than a decade. Many of the environmental and resource issues facing Australian researchers are becoming too complex to tackle in isolation, he says. A solution is to facilitate joint research involving scientists from a range of disciplines.

The new multi-divisional program has its roots in the 1982/83 ENSO episode, which caused Australia's most severe drought in a century and led to the catastrophic Ash Wednesday bushfires of January, 1983.

On the opposite side of the Pacific, tropical storms ravaged California, causing flooding and mudslides. In 1991 the Los Angeles Times reported the 1982/83 El Niño had resulted in 1500 human deaths and caused between \$2 billion and \$8 billion in property damage and production losses in Pacific-Rim nations.

The multi-billion dollar costs associated with the 1982/83 El Niño prompted a decade of intensive research on both sides of the Pacific into the mechanisms of climate variability.